

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

Paper No. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BEREND T. JONKER

Appeal No. 95-3335
Application 08/083,231¹

ON BRIEF

Before THOMAS, HAIRSTON and LEE, Administrative Patent Judges.
LEE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the
final rejection of claims 1-6 and 25-26. Claims 7-24 and 27-28
have been objected to as being dependent from a rejected claim.

Reference relied on by the Examiner

IBM Technical Disclosure Bulletin, "Imaging Magnetic Domains on
Ferromagnetic Thin Films on III-V Compounds by Tunneling
Luminescence Microscopy," vol. 33, no. 11, pp. 469-472, 1991.
("IBM Disclosure")

¹ Application for patent filed June 29, 1993.

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The Rejection on Appeal

Claims 1-6 and 25-26 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over the IBM Disclosure.

The Invention

The invention is directed to light emitting semiconductor devices and processes which use spin-polarized carriers to produce circularly polarized light.

Claims 1 and 25 are the only independent claims. They are reproduced below:

1. A device for producing polarized optical emission, comprising:

a semiconducting heterostructure, further comprising at least one doped semiconducting layer;

a contact having a net magnetic moment, in electrical contact with a region of said semiconducting heterostructure;

a contact electrically connected to a different region of said semiconducting heterostructure.

25. A method for producing circularly polarized optical emission, comprising the step of applying a bias across a semiconducting heterostructure through a magnetic contact having a net magnetic moment, thereby injecting spin polarized carriers into said semiconducting heterostructure for recombination to produce circularly polarized light.

Opinion

Our opinion is based solely on the arguments raised by the appellant in his brief. We do not address and offer no opinion

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on arguments which could have been raised but were not set forth in the brief.

We sustain the rejection of claims 1-6 and 25-26 as being unpatentable over the IBM Disclosure.

The appellant has grouped all rejected claims 1-6 and 25-26 together for single treatment (Br. at 3). We discuss claim 1.

Initially, the appellant makes several arguments (Br. at 4): (1) the claimed first contact serves as the source of primary electrons whereas the magnetic thin film in the IBM Disclosure is merely a source of secondary electrons; (2) in the appellant's invention it is the primary electrons which are recombined with holes, not secondary electrons as in the case of the IBM Disclosure; and (3) the magnetic thin film in the IBM Disclosure does not have a net magnetic moment. The examiner correctly rejected all three of these arguments.

It is true that in the invention described in the IBM Disclosure, the primary source of electrons is the tunneling electron microscope and the primary electrons create a cascade of spin-polarized secondary electrons in the magnetic thin film which in turn are recombined with holes in the semiconductor substrate. See IBM Disclosure at page 469. The examiner correctly points out that nothing in the appellant's claims

requires either (a) that the contact having a net magnetic moment be a source of primary electrons as opposed to secondary electrons, or (b) that the circularly polarized light be generated by recombination of primary electrons, as opposed to secondary electrons, with holes. The appellant has pointed to nothing in the claims to support his argument based on a distinction between primary electrons and secondary electrons.

It is the claims which define the subject matter sought to be patented. It is improper to read features into the claims from the specification, where they are not required to make sense of the claims. See, e.g., In re Priest, 582 F.2d 33, 37, 199 USPQ 11, 15 (CCPA 1978). The claims are simply too broad and not commensurate in scope with the appellant's arguments.

We also agree with the examiner that the entire magnetic thin film need not have a net magnetic moment in order to meet the requirement of the claims. It is sufficient that the local area of the magnetic thin film which serves as a source or location of carrier injection underneath the electron microscope has a net magnetic moment. As claimed, the contact having the net magnetic moment need only be in electrical contact with a region of the semiconductor substrate, not the entire surface thereof. The area on the magnetic film providing the carrier

injection is such a contact. It is not helpful to the appellant that the net magnetic moment in the electrical contact region can be balanced out by magnetic moments elsewhere if all the magnetic moments are added together. Moreover, the appellant has not challenged or rebutted the examiner's finding that the IBM Disclosure describes techniques applicable to any ferromagnetic film, "including the more common situation where different regions of the film have magnetic moments that do not add up to zero, as in a refrigerator magnet" (answer at 3, lines 14-16).

In the appeal brief on page 4, lines 13-14, the appellant argues that the IBM Disclosure does not suggest to "directly provide optical emission which is circularly polarized to a significant degree." By "directly," the appellant means "e.g., without additional optical elements such as the polarizer 6 [in the IBM Disclosure]," as is indicated also on page 4 of the appeal brief. But the examiner is correct that the polarizer 6 in the IBM Disclosure is a part of the detector elements used to analyze the emitted light and not a part of the elements for producing the circularly polarized light. See IBM Disclosure at p. 470, lines 5-7. Accordingly, the appellant's argument is rejected.

The appellant further argues that the IBM Disclosure does not suggest the production of "useful quantities" of circularly polarized light, since it suggests only injection of small quantities of electrons into small areas where a magnetic moment may or may not exist. However, the examiner is also correct that the claims do not require any particular quantity of light to be emitted and that the amount of light emitted in the device of the IBM Disclosure is sufficiently useful for the purpose disclosed. The appellant's argument is without merit.

The IBM Disclosure does not expressly disclose a second contact contacting another region of the semiconductor substrate. However, the examiner gave many plausible reasons why it would have been obvious to one with ordinary skill in the art to recognize that such a second contact should be provided. Among the reasons given by the examiner are: (1) the second contact would set up an electric field inside the substrate to draw the electron flow in the proper direction; and (2) the second contact would provide a discharge path for the electrons which are accumulating in the substrate. See the examiner's discussion in the answer from page 4, line 15, to page 5, line 2. These reasons are rational and plausible. Therefore, the burden has

shifted to the appellant to rebut the reasoning set forth by the examiner.

The appellant argues (Br. at 5, lines 8-10) that "the provision of an additional contact for applying a bias (and a current) to the semiconductor could only be for the purpose of increasing optical emissions over an increased area." That, however, does not account for or otherwise nullify the examiner's stated reasons on why it would have been obvious to one with ordinary skill in the art to provide the second contact. Thus, the argument is not helpful to the appellant.

The appellant further argues that increased optical emissions would interfere with and probably prevent the resolving of particular domains of the thin film. But appellant's argument does not take the place of evidence, and there is no declaration evidence in this record tending to show that the addition of a second electrode in the device according to the IBM Disclosure would render that device inoperative or unuseful. Note that even the appellant uses the speculative term "probably" in his argument. We conclude that the appellant has not established that the presence of a second electrode in the device of the IBM Disclosure would cause significant or substantial interference

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such that one with ordinary skill in the art would not see fit to provide the second electrode.

Finally, the appellant argues that there is nothing in the IBM Disclosure which suggests a solution to the problem addressed by the appellant or the benefits of producing circularly polarized light without additional optical elements. However, in an obviousness determination, the prior art need not suggest solving the same problem set forth by appellant. In re Dillon, 919 F.2d 688, 692-93, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990) (in banc) (overruling in part In re Wright, 848 F.2d 1216, 1220, 6 USPQ2d 1959, 1962 (Fed. Cir. 1988)), cert. denied, 500 U.S. 904 (1991). Moreover, the device of the IBM Disclosure does produce circularly polarized light without using a quarter wave plate like that shown in prior art Figure 1 of the appellant's specification. The appellant's arguments are unpersuasive. Additionally, note also that the advantages and/or problems with which the appellant is concerned are not recited in the claims.

In our view, the appellant has not sufficiently rebutted the examiner's reasons for providing a second electrode on the semiconductor substrate.

For all of the foregoing reasons, we sustain the rejection of claims 1-6 and 25-26.

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Conclusion

The rejection of claims 1-6 and 25-26 under 35 U.S.C. § 103 as being unpatentable over the IBM Disclosure is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

JAMES D. THOMAS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
KENNETH W. HAIRSTON)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
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